Patent Application of

Dingge Xiong

For

COMBINABLE-FREE ORNAMENTAL DEVICE AND METHOD OF COMBINATION

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of US Provisional Application No 60/465,461, filed 04/28/2003.

FIELD OF THE INVENTION

The present invention is related to an ornamental device, especially to such an ornamental device which can be appropriately cut and then a plurality of cut ornamental devices can be recombined together to a more complex, nice-looking pattern.

BACKGROUND OF THE INVENTION

An embossed ornamental pattern of a ceiling and a wall is one of the important features of Roman buildings. A painted pattern and a fresco are the typical ornament of a palace, a temple, a luxury house and other important buildings in the Orient. These ornaments bring admirable aesthetic enjoyment to us. Generally, these ornaments are specially

designed and are custom-built for a special building, and all such ornaments are not an industrialized product, so it is very difficult that the ornaments designed for the special building can fit to other buildings in size or in style, and doing so will spend a lot of time and money, so average person can only enjoy them, but not be able to bring them back to his (her) own home.

A molding is widely adopted in a modern building. The molding can be mass-produced industrially, so it is economical. We can easy see their figures in many common houses. However, its effect is not able to rival that special relievo. This is because its linear design limits its expressive power, and it is almost not able to make more complex patterns like circles, curves and ovals. Another one for lights and fans, called Ceiling Medallion, has a fixed circular shape and an unchangeable size. All of the existing ornaments do not leave a re-creative space to designers and users.

We have seen various houses, and some of them have a nice interior design from furniture to furnishings, from draperies to carpets, but the ceiling and the wall look pale in comparison to them, especially on the ceiling there is almost no ornament besides the unsightly holes of recessed lights and the vents of air conditions. Why we can't hide these holes and vents into the whole aesthetic design of the ceiling and make them harmonious? A consumer needs a better decorative product for the ceiling and the wall. Since the linear design limits the expressive power of the molding, and the unchangeable ceiling medallion is not able to create various patterns, let us change the linear design and make the unchangeable ornament changeable. The present invention is giving an ideal solution with a new ornamental device that has a flat predetermined shape with at least one arc edge, and can be cut appropriately and can be recombined-free. Such recombinable ornamental device is smaller in its dimension, so transportation and installation is easy, and it can be mass-produced industrially, so it is economical too. The ornamental device can not only be used for the ornamentation of the ceiling and the wall, but also is suitable for a door, furniture, or other similar surfaces.

DESCRIPTION OF THE PRIOR ART

There are other ornamental devices designed for ceiling and wall decorating. The typical of these are U.S. Pat. No. 6,627,284 issued to Naidj, U.S. Pat. No.6,667,109 issued to Julliard and U.S. Pat. No. 5,496,512 issued to Logan.

A decorative wall and ceiling device comprises a decorative base member, a peal-away back layer and an adhesive layer. The decorative base member has embodiments comprising a flat surface embodiment, a flat surface embodiment having attachable pieces and an embroidered embodiment which utilizes a cut-out portion as a part of the design. The body of the decorative member may comprise cross-linked polyethylene foam with a thin membrane film being the peel-off backing. The present invention can be cut and sized into a variety of shapes which can be used in combination with each other.

A decorative medallion consists of two pieces that may be assembled about a mounted fixture. The medallion pieces are decorated with surface ornamentation to add to their visual appeal. A first piece of the medallion includes at a first end an overlapping member whose outline follows prominent features in the surface ornamentation, and at a second end an underledge designed to receive the overlapping member of the second piece. The second piece similarly includes an underledge that is designed to receive the overlapping member of the first piece. The respective overlapping members have recessed edges that are shaped to include one or more alignment features, such as protrusions and concave receiving portions. The underledges are shaped to slideably mate with the corresponding alignment features of the respective overlapping members, and thus, include various corresponding concave receiving portions and protrusions. The alignment features allow the two pieces to slide relative to one another into both lateral and vertical alignment, and the respective outlines of the top surfaces of the overlapping members essentially hide the seams in the surface ornamentation.

A decorative molding for a corner formed by a ceiling and a vertical wall comprises a thin strip of flexible plastic and is secured to the wall by an attachment allowing the molding strip along its upper and lower edges to be flexible to conform with uneven surfaces in the ceiling and/or wall. In one form the strip is attached to the wall by an

adhesive. In another form, a wall track and clip arrangement is utilized to provide easy removal from the wall for paint or wallpaper application. A corner element is provided in one form in which ends of the strips are adhesively secured thereto in overlapping engagement. In another embodiment, the strips are telescopically connected to the corner element.

Other referenced patents were issued to McGeehan-Hatch as U.S. Pat. No. 5,523,129; Martinez and Martinez as U.S.Pat.No.4,900,604; Edwards as U. S. Pat. No.5,001,877; Chapman as U. S. Pat. No.4,521,464; Travis as U.S. Pat. No. 4,584,218 and Johnson, et al. as U. S. Pat. No. 5,491,006.

While these ceiling and wall decorations may be suitable for the purposes for which they were designed, they would not be as suitable for the purposes of the present invention, as hereinafter described.

BRIEF SUMMARY OF THE INVENTION

The present invention is providing a combinable-free ornamental device, and it is a basic unit to create more complex, nice looking decorative patterns. The ornamental device is a flat body of material, and its front surface is decorated with surface ornamentation, such as a relievo, a painted pattern, etc. to add to its visual appeal, and its back is planar, or at least the edge of the back is in an identical plane, so that the ornamental device can be secured to the ceiling or the wall or furniture or a similar surface, and it has a predetermined shape with at least one arc edge, and the shape of its main body is symmetrical. At the edge of the ornamental device there are a plurality of cutting points and cutting vertexes suitable for cutting the body of material, and the ornamental device can be cut appropriately through the cutting points and the cutting vertexes, and its shape can variously be changed due to choosing different cutting points and cutting vertexes for cutting, and further such cut ornamental devices can be recombined together by putting the back of the ornamental device against the ceiling or the wall... and by joining one another's cut cross-section butt and butt to create the more complex, nice-looking decorative patterns with various sizes and forms. With the

ornamental device of the present invention and by the method of the recombination of the present invention we can create many nice-looking geometric decorative patterns even if we just use an identical type of the combinable-free ornamental device.

DRAWING FIGURES

In the drawings, closely related figures have the same number but different alphabetic suffixes.

Fig. 1 shows a basic geometric shape of the main body of the ornamental device of the present invention and the geometric method of producing such shape.

Fig. 2a shows the flat shape and the surface pattern of the ornamental device of the present invention; Fig. 2b is a sectional drawing taken along the line 2b-2b of Fig.2a; Fig. 2c is a sectional drawing taken along the line 2c-2c of Fig.2a.

Fig. 3 shows different linear patterns made up of a plurality of the ornamental devices of the present invention.

Fig. 4a shows cutting lines on the ornamental device of the present invention for the patterns made up of the 3 or 4 cut ornamental devices; Fig. 4b shows a shield made up of the 3 cut ornamental devices; Fig. 4c shows a donut made up of the 4 cut ornamental devices; Fig. 4d shows another pattern made up of the 4 cut ornamental devices.

Fig. 5a shows the shape of the ornamental device that has been cut for a pattern made up of the 10 ornamental devices of the present invention; Fig. 5b shows a garland made up of the 10 ornamental devices cut so.

Fig. 6a shows the shape of the ornamental device that has been cut for a pattern made up of the 16 ornamental devices of the present invention; Fig. 6b shows a garland made up of the 16 ornamental devices cut so.

Fig. 7a shows the shape of the ornamental device that has been cut for a pattern made up of the 12 ornamental devices of the present invention; Fig. 7b shows a garland with centripetal arcs made up of the 12 ornamental devices cut so.

Fig. 8 shows a diamond pattern made up of the ornamental devices of the present invention.

Fig. 9 shows some different patterns separately made up of the arc parts and the square parts after we separate the two squares from the ornamental device.

Figure 10a shows a new unit made up of the 3 ornamental devices. Fig. 10b shows a corolla made up of the 6 new units. Fig. 10c shows a big annular pattern made up of the 24 shields (here the shield is looked upon as a new unit, see Figure 4b).

Fig.11a. shows the shape of the ornamental device that its two ends are cut into the semicircle arcs; Fig. 11b shows a beautiful pattern made up of the ornamental devices with the two arc ends.

Figure 12 shows a synthetical design for decorating a ceiling.

Fig. 13a shows the shape and the surface pattern of a second embodiment of the ornamental device of the present invention; Fig. 13b shows a garland made up of a plurality of such embodiments of the ornamental device of the present invention.

Fig. 14a shows the shape and the surface pattern of a third embodiment of the ornamental device of the present invention; Fig. 14b shows a polygon made up of a plurality of such embodiments of the present invention.

Fig. 15a shows the shape and the surface pattern of a fourth embodiment of the ornamental device of the present invention; Fig. 15b shows an oval made up of a plurality of such embodiments.

Fig. 16 shows how to recombine the ornamental devices to an elliptic pattern.

DESCRIPTION OF THE PREFERRED EMBODIMENT

First, let us discuss how we get the main body of the ornamental device of the present invention. See Fig. 1.

1. In a plane draw two straight lines XX' and YY' that they are perpendicular to each other and intersect at point O.
2. Draw a square ABCD with center O, and the length of its side is L, i.e. AB=BC=CD=DA=L.
3. Suppose the distance from center O to point A is r, and then draw a circumcircle of square ABCD with center O and the radius of r.
4. Draw another small concentric circle with center O and the radius of 1/2r.

5. Extend line segment AB at its two ends separately to points E and F and make AE=BF=1/2r.
6. Take a point I on line segment AD and make AI=1/2r, and take a point J on line segment BC and make BJ=1/2r too. Connect point I with point J to get line segment IJ, then extend it at its two ends separately to points G and H and make GI=JH=1/2r.
7. Connect points E with G, points F with H separately. Obviously, EG=FH=1/2r. So, we have got two small squares, i.e. square AIGE and square BJHF, and between the two squares is a figure similar to an arc. By the seven steps above we complete the main body of the ornamental device of the present invention. Next let us add a bit of embellishment to the main body to beautify it.
8. A straight line GH divides the small concentric circle mentioned above into a big arc and a small arc. Draw a smaller circle with the diameter of about 3/16r between the small arc and straight line GH, and straight line YY' goes through its middle, and a small rectangle joins it to the main body of the ornamental device. The smaller circle is an optional embellishment. You may cut off it if you don't like it.
9. Draw separately a semicircle arc (arc KP, arc QS) with the center of the small square and the radius of 1/4r in square AIGE and square BJHF.

In Fig. 1, the part filled up with cells is just the basic geometric shape of the ornamental device of the present invention. Some small embellishments may be arranged at the edge of the ornamental device besides the optional small circular embellishment mentioned in above step 8. Through the above drawing process we know that the ornamental device provided by the present invention is a flat body of material, and it has a predetermined shape with at least one arc edge, and the shape of its main body is symmetrical.

Fig. 2a shows the flat shape and the surface pattern of the ornamental device of the present invention. The patterns on the surface may be various, and they may be embossed, painted, or inlaid with crystals... Figure 2b is the section drawing taken

along the line 2b-2b of Fig.2a. Figure 2c is the section drawing taken along the line 2c-2c of Fig.2a. From the section drawings we can find that the back of the ornamental device is planar (see section 2c), or at least the edge of the back is in an identical plane (see section 2b), so that the ornamental device can be secured to the ceiling, or the wall, or furniture or a similar surface. The ornamental devices with the same flat shape may have different solid structures, for example, the ornamental device with the embossed ornamentation has a concavo-convex structure, and both the front and the back of the ornamental device with the painted ornamentation may all be planar.

We can see in Fig. 2a that at the edge of the ornamental device there are a plurality of cutting vertexes (points A,B,E,F,G,H) and cutting points (points 2,4,6...) suitable for cutting the ornamental device, and the ornamental device can be cut appropriately through the cutting points and cutting vertexes, and its shape can variously be changed due to choosing different cutting points and cutting vertexes for cutting, and further such cut ornamental devices can be recombined together by putting the back of the ornamental device against the ceiling, or the wall, or the similar surface, and by joining one another's cut cross-section butt and butt to form the decorative patterns with various sizes and forms. With the ornamental device of the present invention and by the method of the recombination of the present invention we can create many nice-looking geometric decorative patterns even if we just use an identical type of the combinable-free ornamental device. The ornamental device can not only be used for the ornamentation of the ceiling and the wall, but also is suitable for a door, furniture, or other similar surface.

OPERATION

Next we will discuss how to cut the ornamental device of the present invention and how to recombine the cut ornamental devices into our desired patterns. To describe conveniently, first let us define that points A, B, E, F, G and H are cutting vertexes, and numeral points, such as points 4, 6, 10, etc. are cutting points, and (L) and (R) means the left and the right of the ornamental device. The numeral cutting points should be

marked on the surface of the ornamental device of the present invention. Ordinarily, the numeral cutting points marked at the small arc part of the bottom edge of the ornamental device are related to cutting vertexes A and B; the numeral cutting points marked at the bottom edge of the two small squares are related to cutting vertexes E and F; the numeral cutting point marked at the top edge of the two small squares are related to cutting vertexes G and H. See Figure 2a.

As state above, the ornamental device plays a role of a basic unit in the process of recombining, and any complex, nice-looking pattern is combined by a plurality of such basic units, so sometimes also we call the ornamental device the basic unit. Now let us illustrate:

1. With no cutting, one by one, the ornamental device may be joined to form waved lines or straight lines. The type of the line depends on the method of arranging the ornamental devices. Figure 3 shows the several types of the lines.
2. Fig. 4a shows cutting lines on the ornamental device of the present invention for the decorative patterns made up of the 3 or 4 ornamental devices. As shown in Figure 4a, if we separately cut the ornamental devices along the cutting lines connecting vertex A with numeral point 3(L) and connecting vertex B with numeral point 3(R), we can piece the 3 cut ornamental devices together to form a shield, see Figure 4b; if we cut the ornamental devices separately along cutting lines A4(L) and B4(R), see Figure 4a, we can put the 4 cut ornamental devices together to get a donut, see Figure 4c; if we cut the ornamental devices separately along cutting lines E4(L) and F4(R), see Figure 4a, we can get a pattern made up of the 4 cut ornamental devices. See Figure 4d.
3. If we cut these ornamental devices separately along the cutting lines connecting vertex A with point 10(L) and connecting vertex B with point 10(R) we can have the ornamental devices cut, as shown in Figure 5a, and it means we may piece the 10 cut ornamental devices together to form a big garland. See Figure 5b. Certainly, we may piece more or less ornamental devices together so long as to cut along the corresponding cutting lines.

4. If we cut these ornamental devices separately along the cutting lines connecting vertex E with numeral point 16(L) and connecting vertex F and numeral point 16(R) in the small squares of the two sides of the ornamental device, see Figure 6a, and then recombine them together, we may get a garland with arcs and angles arranged by turns. See Figure 6b.
5. We may piece the cut ornamental devices together to form a garland with the centripetal arcs, see Figure 7b, if we choose points G and H as the cutting vertexes to cut these ornamental devices along cutting lines H12(L) and G12(R). See Figure 7a.
6. Besides the lines and the annulus mentioned above we may also piece the ornamental devices together to form a diamond shape. See figure 8.
7. We may cut these ornamental devices along straight lines AI and BJ to separate the two squares from the ornamental device, and then separately join the arc parts or the square parts together for different patterns. See Figure 9.
8. We may join several ornamental devices (basic units) together to make a new unit, and then use this new unit to create our desired pattern. Figure 10a shows the new unit made up of the three cut basic units. By cutting the two sides of the new unit, we can create many interesting patterns. A corolla shown in Figure 10b is just made up of the six new units. For another example, we can also use the shield shown in Figure 4b as a new unit, and the pattern shown in Figure 10c is made up of the 24 shields.
9. If we cut or snap off along arc KP and arc QS, the two ends of the ornamental device are changed to arc ends, see Figure 11a. With the ornamental device having the two arc ends, we can form many patterns without further cutting, see Figure 11b. From Figure 11b, we find that a joint between the two arc ends is a tangent joint.
10. Besides to form the patterns mentioned above, we can further synthesize these patterns to create a more complex, nice-looking design. Figure 12 shows a synthetic design for decorating a ceiling.

As stated above, for this embodiment of the ornamental device of the present invention, the cutting vertexes are separately located at the vertexes of the two squares actually, and some numeral cutting points in common use should separately have been marked on the left and the right of the ornamental device. The number of the numeral cutting point indicates that we should use this number of the ornamental device for our garland if we want to cut the ornamental devices through this numeral point, that is, if we intend the 4 ornamental devices for our garland, we should cut the 4 ornamental devices along the cutting lines connecting certain of numeral cutting points 4 with the corresponding cutting vertexes, depending on our design, and if we prefer the 16 ornamental devices to form a garland, cut through cutting points 16. These numeral cutting points make users easy find out the cutting lines they need, but these numeral points apply only to a circular shape.

If a number we want is not marked, we should do as the following steps. Suppose we will use the X ornamental devices for a circular garland, and we will like to cut through vertexes A and B, and then we should clockwise turn line segment AB through angle α with A as the vertex to get a cutting line and counterclockwise turn line segment AB through angle α with B as the vertex to get another cutting line, here the value of angle α should be **$\alpha=90°-360°/2X$**. After to do so, we get the two cutting lines separately to pass vertexes A and B, and the two cutting lines are just the cutting lines we wanted for the garland made up of the X ornamental devices. For cutting vertexes E and F, G and H, we can also get the corresponding cutting lines by the similar operation.

How to determine how many ornamental devices should be used to create our pattern, mainly it depends on the space of the ceiling, the wall or other similar surface and the size of the desired pattern. Here we illustrate with a garland. Two important basic data have been determined while the ornamental device is made in a shop, and they are just the distance between vertexes A and B and the length of line segment AE and BF. (In other embodiments, the basic data to be determined may not be them, but other ones.) The relationship between radius R of the garland and number X of the ornamental device that we should use for the garland may be indicated by the following formula:

If with points A and B as the cutting vertexes: **R=** $\frac{L/2}{Sin(360°/2X)}$

If with points E and F or G and H as the cutting vertexes: **R=** $\frac{L/2+L'}{Sin(360°/2X)}$

In which, R is the radius of the desired circular garland, and L is the distance between vertexes A and B, and L' is the length of line segment AE and BF. Here, L'=1/2r, also we know that r is the radius of the circumcircle. X is the number of the ornamental device to be used for the circular garland. L and L' have been determined by the product (we prefer they are integers to calculate easy), that is, L and L' is known in the formula, and for the different type of the ornamental device, the values of L and L' may be different. In the formula, R and X are not known. Suppose we want a circular garland with the radius of 60", i.e. R=60", we can get the value of X by calculating with above formula, next we take an integer closest to X, and this integer is just the number of the ornamental device we need. We can find out the corresponding cutting line through the method recited above once we know the value of X.

Above several formulas apply only to the circular shape. For a straight line, a polygon, to determine the number of the ornamental device and the cutting angle is simpler, but for an ellipse, a curvy line, it is usually more complex. It is a good idea. Do some reduced paper molds of the ornamental device, see Figure 16, and put a certain pair of the cutting vertexes of the paper molds on an outline of the desired pattern reduced to the same scale, like the outline of the ellipse in Figure 16, one by one, and make the adjacent cutting vertexes of the two neighboring paper molds overlap, here vertex F of paper mold 1 and vertex E of paper mold 2 overlap, so the opposite edges of these two vertexes intersect, their intersection is point W in this case. Cut these paper molds along the cutting lines connecting these vertexes with the intersectant point of their opposite edges, so we get the cutting angles of every paper mold. Give a sequence number to every paper mold, and then transfer the cutting angles to the corresponding actual ornamental device to cut them.

The embodiment described above is a representative solution of the ornamental device of the present invention. Its feature is to have both the arc shape and the square shape simultaneously in one ornamental device, so with it we can create the various decorative designs.

If we retain only the circular flower in the two squares, but take off the other base part, we can get a new ornamental device with two flowery ends, and this is just a second embodiment of the ornamental device of the present invention. See Figure 13a. With such embodiment of the ornamental device, we may combine a plurality of such embodiments together at any angle without more cutting. This is because the joint between the two circles (or arcs) may be the tangent point, but not have to be the straight line, Figure 13b is an applied example of the second embodiment. If we separate the two circular flowers from the two ends of the ornamental device, we may put only these circular flowers together to form good patterns, see Figure 13c.

The two ends of a third embodiment of the present invention are neither an arc nor a straight line, but just a point. The combinative method of such embodiment is similar to one of the second embodiment because of its pointed end. See Figure 14a and 14b.

Shown in Figure 15a is a fourth embodiment of the ornamental device. Its shape has changed much more, but this change still complies with the principle of the symmetry of the main body of the ornamental device. Even though there may be some asymmetric element, for example, some embellishments of triangles and semicircles are arranged asymmetrically at the top edge of the ornamental device, this doesn't influence its symmetric feature in substance. Here so-called symmetry means mainly the symmetry of the main body of the ornamental device. Figure 15b shows an elliptic pattern made up of the fourth embodiment of the ornamental device.

The cutting vertexes of the second, the third and the fourth embodiments of the ornamental device are more unobvious than one of the embodiment shown in Fig. 2a,

but they may be marked out in the process of the manufacture. Certainly, they can also be cut and be recombined as stated above.

Through above examples we find that there are the two types of the joint of the ornamental device, one of them is the linear joint, and another is the tangent joint. The linear joint is smoother, and its finished pattern looks a whole. The tangent joint reveals the trace of the combination, and we can distinguish every ornamental device from the combined pattern, but it has less cutting.

The ornamental device of the present invention may be made of the various kinds of material, such as hard plastic, soft plastic, wallpaper, wood, silk flower and crystal, etc. Their decorative effect should be different due to different material.

Install and ship them is very easy due to their small size. For the ornamental device made of the different material, the method of the installation is different. Say, for the ornamental device made of the hard material, first draw an outline of our desired pattern on the ceiling or the wall or any surface we like to decorate, and cut the ornamental devices as required, and then put vertexes A and B or E and F or G and H of the cut ornamental device on the outline, and make the back of the ornamental device against the ceiling or the wall or the similar surface, and closely join one another's cut cross-section butt and butt. Next, fix them with nails or screws or an adhesive, and apply an adhesive to all joints, and fill countersink with spackling paste. Finally paint, stain them as desired, say, an antique style. For the ornamental device of the wallpaper type, the product may be self-adhesive. The users merely put the vertexes of these ornamental devices on the outline of the pattern on the ceiling or the wall and then stick them. That is it.